

AMENDMENTS TO THE CLAIMS:

1. (Currently amended) A process of using a highly efficient catalyst-solvent system of dilute solutions of a base in water to effect a base catalyzed depolymerization (BCD) reaction for converting a biomass into a blending component for a petroleum-derived fuel comprising:
 - (a) extracting a lignin-containing fraction in ~~a reaction medium~~ of water from the biomass to provide a lignin feed material;
 - (b) base-catalyzed depolymerizing the lignin feed material in ~~the presence of water~~ and a low base concentration of about 2 to about 5 weight % in the absence of alcohol to provide a first composition comprising a depolymerized lignin conversion to ether solubles of between about 73 to about 74.5 weight percent; and
 - (c) hydroprocessing the depolymerized lignin by ~~sequential or simultaneous~~ hydrodeoxygenation and hydrocracking using a mixture of a co-catalyst system of a sulfided $\text{MMo}/\gamma\text{-Al}_2\text{O}_3$ for hydrodeoxygenation and a sulfided $\text{MMo}/\text{SiO}_2\text{-Al}_2\text{SO}_3$ -zeolite for hydrocracking, where M=Group VI-VIII transition metal promoters of Ru, Co, Re, Cr, Fe, Pt and combinations thereof to provide a second composition comprising an aromatic hydrocarbon comprising $\text{C}_7\text{-C}_{10}$ alkylbenzenes of a purity of >90 weight%, for use as a high octane blending component for ~~a petroleum or~~ lower grade petroleum-derived fuel gasoline.
2. (Canceled)
3. (Canceled)
4. (Original) The process of claim 1 wherein the blending composition is further defined as having a blending octane number of about 110 or higher.
5. (Canceled)
6. (Canceled)
7. (Original) The process of claim 1 wherein the biomass is a lignocellulose biomass.
8. (Currently Amended) The process of claim 1 wherein the second composition is further defined as comprising about 5% to 40% alkylated naphthenes.
9. (Currently Amended) The process of claim 8 wherein the second composition comprises about 5% to 30% alkylated naphthenes.
10. (Previously Amended) The process of claim 1 wherein the second composition is further

defined as comprising from about 75% to about 95% C₇ to C₁₀ alkylbenzenes.

11. (Original) The process of claim 1 wherein the biomass is further defined as comprising from about 5% to about 70% lignin.
12. (Original) The process of claim 11 wherein the biomass comprises about 50% lignin.
13. (Original) The process of claim 1 or 12 wherein the biomass is further defined as comprising a Kraft lignin, organosolve lignin, a lignin derived from wood processing, a lignin as an ethanol process by-product, a lignin from a by-product of pulp and paper processing, or a combination thereof.
14. (Original) The process of claim 1 wherein the aqueous solvent comprises a dilute alkali hydroxide solution.
15. (Original) The process of claim 14 wherein the alkali hydroxide solution is about 0.5% to about 10% wt of an alkali hydroxide.
16. (Original) The process of claim 15 wherein the alkali hydroxide solution is about 0.5% to about 3% by wt NaOH.
17. (Original) The process of claim 1 wherein the depolymerization is carried out in the presence of a CsX-type zeolite as a superbase catalyst.
18. (Original) The process of claim 17 wherein the solid CsX-type zeolite superbase catalyst is used together with a 0.5% - 5% alkali hydroxide solution as a co-catalyst system.
19. (Previously Amended) The process of claim 1 wherein the base-catalyzed depolymerization is further defined as occurring at an operational temperature of from about 300°C to about 340°C.
20. (Original) The process of claim 19 wherein the base-catalyzed depolymerization operation temperature is from about 310°C to about 330°C.
21. (Previously Amended) The process of claim 1 wherein the lignin-containing feed material has a liquid hourly space velocity of from 0.5h⁻¹ to about 10h⁻¹.
22. (Original) The process of claim 21 wherein the liquid hourly space velocity is from about 2.0h⁻¹ to about 9.0h⁻¹.
23. (Canceled)
24. (Canceled)
25. (Currently Amended) The process of claim 24 1 wherein the ratio of MMo/γ- Al₂O₃

catalyst: sulfided $\text{MMo/SiO}_2\text{-Al}_2\text{O}_3$ zeolite catalyst is from 1:1 to 9:1.

26. (Cancelled)

27. (Original) The process of claim 1 wherein the hydroprocessing is further defined as comprising a hydrogen pressure of from about 500 psig to about 1800 psig.

28. (Original) The process of claim 27 wherein the hydrogen pressure is from about 500psig to about 1000 psig.

29. (Original) The process of claim 1 wherein the hydroprocessing is further defined as comprising a reaction temperature of from about 360°C to about 390°C.

30. (Original) The process of claim 29 wherein the reaction temperature is from about 380°C to about 390°C.

31. (Canceled)

32. (Canceled)

33. (Withdrawn) A biomass-derived blending component for a petroleum or petroleum-derived fuel comprising about 70% to about 95% C_7 to C_{10} alkylbenzene.

34. (Withdrawn) The biomass-derived blending component of claim 33 further defined as comprising about 5% to about 30% alkylated naphthenes.

35. (Withdrawn) The biomass-derived blending component of claim 33 further defined as comprising about 5% to about 10% alkylated naphthenes.

36. (Withdrawn) A method for enhancing the octane number of a petroleum or petroleum-derived fuel comprising: combining the biomass derived blending component of claim 33 with a petroleum or petroleum-derived fuel at a ratio of about 1:10 to about 1:4 by volume to provide a blended fuel, wherein the octane level of the petroleum blended fuel is enhanced about 1% to about 30% over the octane level of the petroleum or petroleum-derived based fuel without the blending component.

37. (Withdrawn) The method of claim 36 wherein the octane level of the blended fuel is enhanced about 30% over the petroleum or petroleum-derived fuel without the blending component.

38. (Withdrawn) The method of claim 36 wherein the petroleum or petroleum-derived fuel is gasoline.

39. (Currently Amended) A process of using a highly efficient catalyst-solvent system of

dilute solutions of a base in water to effect a base catalyzed depolymerization (BCD) reaction for converting a biomass into a blending component comprising a monocyclic aromatic hydrocarbon-rich composition for petroleum-derived fuels comprising:

- a) dispersing a lignin-containing feedstock material in ~~a reaction medium~~ of water to provide a dispersed lignin composition;
- b) base-catalyzed depolymerizing the dispersed lignin composition in ~~the presence of~~ water and a low base concentration of about 2 to about 5 weight percent in the absence of alcohol to provide a depolymerized lignin conversion to ether solubles of between about 73 to about 74.5 weight percent; and
- c) hydroprocessing the depolymerized lignin product by ~~sequential or simultaneous~~ hydrodeoxygenation and hydrocracking using a mixture of a co-catalyst system of sulfided $\text{MMo}/\gamma\text{-Al}_2\text{O}_3$ for hydrodeoxygenation and a sulfided $\text{MMo}/\text{SiO}_2\text{-Al}_2\text{SO}_3$ -zeolite for hydrocracking, where M=Group VI-VIII transition metal promoters of Ru, Co, Re, Cr, Fe, Pt and combinations thereof to produce a high octane blending component comprising C_7 to C_{10} alkylbenzenes of a purity >90 weight %.

40. (Canceled)

41. (Original) The process of claim 39 wherein the blending component comprises a blending octane number of about 95-150.

42. (Original) The process of claim 39 wherein the blending component is further defined as having a blending octane number of about 110.

43. (Canceled)

44 (Currently Amended) A process for producing BTX (benzene, toluene and xylenes) comprising:

- a) extracting lignin-containing material from a biomass;
- b) dispersing the lignin-containing material in ~~a reaction medium~~ of water;
- c) subjecting the dispersed lignin-containing material to a dilute solution of alkali hydroxide of about 2 to about 5 weight % in water in the absence of alcohol to produce a first composition comprising a depolymerized lignin conversion to ether solubles of between about 73 to about 74.5 weight percent ; and
- d) hydroprocessing the depolymerized lignin by ~~sequential or simultaneous~~

hydrodeoxygenation and hydrocracking using a mixture of a co-catalyst system of a sulfided $\text{MMo}/\gamma\text{-Al}_2\text{O}_3$ for hydrodeoxygenation and a sulfided $\text{MMo}/\text{SiO}_2\text{-Al}_2\text{SO}_3\text{-zeolite}$, where M =Group VI-VIII transition metal promoters of Ru, Co, Re, Cr, Fe, Pt and combinations thereof to provide a second composition comprising benzene, toluene, and xylenes, wherein the benzene, toluene, and xylenes for use as intermediates in the production of other organic chemicals.

45. (Currently Amended) A process of using a highly efficient catalyst-solvent system of dilute solutions of a base in water to effect a base catalyzed depolymerization (BCD) reaction for converting a biomass into a blending composition for a petroleum-derived fuel comprising:

- a) extracting lignin-containing material from a biomass;
- b) dispersing the lignin-containing material in ~~a reaction medium of~~ water;
- c) subjecting the dispersed lignin-containing material to a alkali hydroxide solution of about 2 to about 5 weight % alkali hydroxide to produce a first composition comprising a depolymerized lignin conversion to ether solubles of between about 73 to about 74.5 weight percent;
- d) hydrodeoxygenating and hydrocracking the first composition using a mixture of a co-catalyst system of a sulfided $\text{MMo}/\gamma\text{-Al}_2\text{O}_3$ for hydrodeoxygenation and a sulfided $\text{MMo}/\text{SiO}_2\text{-Al}_2\text{SO}_3\text{-zeolite}$, where M =Group VI-VIII transition metal promoters of Ru, Co, Re, Cr, Fe, Pt and combinations thereof to produce a second composition comprising C_7 to C_{10} alkylbenzenes, wherein the second composition is used as a blending component for a petroleum-derived fuel.

46. (Canceled)

47 (Original) The process of claim 45 wherein the alkali hydroxide solution is about 1% to about 10% wt of an alkali hydroxide.

48. (Original) The process of claim 47 wherein the alkali hydroxide solution is about 1% to about 3% by wt NaOH.

49. (Canceled)

50. (Original) The process of claim 47 wherein the second composition is further defined as comprising from about 75% to about 95% C_7 to C_{10} alkylbenzenes.